

**Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in the application:

**Listing of Claims:**

1. (Canceled)
2. (Canceled)
3. (Canceled)
4. (Canceled)
5. (Canceled)
6. (Canceled)
7. (Canceled)
8. (Canceled)
9. (Original) An apparatus for protecting and transmitting by a transmitter physical layer header information of respective header information of layers, in an ultra wide band (UWB) communication system in which a plurality of devices have the transmitter constitute a piconet and data transmission between the plurality of devices is performed through a frame having said respective header information of the layers, said apparatus comprising:
  - a bi-orthogonal sequence generator for generating a bi-orthogonal sequence by performing an AND operation between more significant bits of physical layer header information bits and predetermined basis Walsh code sequences;

a mask sequence generator for generating a mask sequence by performing an AND operation between less significant bits of the physical layer header information bits and predetermined mask sequences; and

an exclusive OR element for performing an exclusive OR operation on a symbol-by-symbol basis between the bi-orthogonal sequence output from the bi-orthogonal sequence generator and the mask sequence output from the mask sequence generator, so as to output a single encoded symbol sequence.

10. (Original) The apparatus according to claim 9, wherein the physical layer header information bits are 11 bits in length.

11. (Original) The apparatus according to claim 10, wherein the physical layer header information bits include information of a MAC frame's transfer rate and information of a payload length.

12. (Original) The apparatus according to claim 9, wherein the bi-orthogonal sequence generator comprises:

a bit "1" generator for generating a sequence of 1s;

a basis Walsh code generator for generating 5 basis Walsh code sequences of length 32;

and

a plurality of AND elements for receiving all 11 bits of the physical layer header information as their inputs, performing respective AND operations between 5 more significant bits of the 11 bits and the 5 basis Walsh code sequences, and performing an AND operation between a sixth bit of the 11 bits and the sequence of 1s.

13. (Original) The apparatus according to claim 9, wherein the mask sequence generator comprises:

a basis mask sequence generator for generating 5 basis mask sequences of length 32; and

a plurality of AND elements for receiving all 11 bits of the physical layer header information as their inputs, and performing respective AND operations between 5 less significant bits of the 11 bits and the 5 basis mask sequences.

14. (Original) A method for protecting and transmitting by a transmitter physical layer header information, of respective header information of layers, in an ultra wide band (UWB) communication system in which a plurality of devices have the transmitter constitute a piconet and data transmission between the plurality of devices is performed through a frame having said respective header information of the layers, said method comprising the steps of:

a) generating a bi-orthogonal sequence by performing an AND operation between more significant bits of physical layer header information bits and predetermined basis Walsh code sequences;

b) generating a mask sequence by performing an AND operation between less significant bits of the physical layer header information bits and predetermined mask sequences;

c) performing an exclusive OR operation on a symbol-by-symbol basis between the generated bi-orthogonal sequence and the generated mask sequence, and

d) outputting a single encoded symbol sequence.

15. (Original) The method according to claim 14, wherein the physical layer header information bits are 11 bits in length.

16. (Original) The method according to claim 15, wherein the physical layer header information bits include information of a MAC frame's transfer rate and information of a payload length.

17. (Original) The method according to claim 14, wherein said step a) comprises the steps of:

a-1) generating a sequence of 1s;

a-2) generating 5 basis Walsh code sequences of length 32;

a-3) receiving, as inputs, all 11 bits of the physical layer header information;

a-4) performing respective AND operations between 5 more significant bits of the 11 bits and the 5 basis Walsh code sequences; and

a-5) performing an AND operation between a sixth bit of the 11 bits and the sequence of 1s.

18. (Original) The method according to claim 14, wherein said step b) comprises the steps of:

- b-1) generating 5 basis mask sequences of length 32;
- b-2) receiving, as inputs, all 11 bits of the physical layer header information; and
- b-3) performing respective AND operations between 5 less significant bits of the 11 bits and the 5 basis mask sequences.